AMERICAN ELECTRO-PLATERS SOCIETY

(An Educational Society)

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MONTHLY REVIEW

OCTOBER, 1915

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I shall pass through this world but once. Any good thing, therefore, that I can do, or any kindness that I can show to any human being, let me do it now. Let me neither defer nor neglect it, for I shall not pass this way again.—*Amiel.*

MONTHLY REVIEW

American Electro-Platers' Society

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Vol. 2 OCTOBER No. 5

EDITORIALS

KEEP ON SMILING.

Ella Wheeler Wilcox may be all right as a poetess, but we think she would make a bum editor for our Monthly Review, we can't say of the plater that, the man worth while, is the man who will smile when everything goes dead wrong.

The only man we ever heard of who would do that was Mark Tapley, one of Dickens' character, and he was fictitious. We don't like it a dern bit when anything goes wrong in the plating department, and if everything would go wrong, we wouldn't smile again until we got everything going right. Even Fred Liscomb didn't always smile, when he was a plater-foreman. Not that we can't look trouble in the face and laugh at him.

When I was a little boy I used to look upon the whole world as one big joke, made just to amuse me. I have never entirely gotten over that idea. But that solution that won't give results, or that finish that we can't exactly get, that serious perplexing plating trouble that demands your earnest concentrated endeavor.

How we can smile when we overcome it.

The man worth while has a hard taskmaster, he has got to please his own self before he can smile, when he knows that he has done his level best, no fudging, the best he is capable of, then he can surely smile, and the smile that comes from the ability to look the whole world in the face, will never wear off.

We have heard platers say years ago, I get paid for what I know. We never hear things like that now, we would all be glad if we got paid for what we don't know.

Hence the American Electro-Platers' Society. A glance at what the Branches Are Doing will show that collectively and individually we have a right to smile. Let us keep on smiling.

H. J. RICHARDS.

WHAT THE PLATER OUGHT TO KNOW—Continued.

THE METRIC SYSTEM. By F. A. SHEPHERD.

It would seem after going over large quantities of literature and also following the arguments in several trade papers that the principal objection to the Metric System is based on one of three things namely: Ignorance or not able to multiply or divide using the decimal system; Hostility owing to the fact of not knowing its origin; or, Finally owing to the large amount of money that is invested in machinery and implements that the graduated to the inch.

The last is the only cause of opposition that has any merit to it and it is also a fact that the longer the Metric System is put off the more it is going to cost and it is a certainty that if the United States is going to get new outlets for trade and development of the foreign markets that were formerly supplied by the Nations at war, and especially Europe's old customers who were educated to the Metric System, then the United States manufacturers will have to adopt the Metrical System or lose out, as there would be as much confusion for those people to try and adapt their simple systems to our complicated systems, as there is for us to adopt the Metric System to our every day requirements.

Silvanus Thompson's Elementary Lessons in Electricity and Magnetism is a recognized text book and accepted also among Scientific people as such has this to say in regard to fundamental units, Paragraph No. 280.

"All physical qualities, such as force, velocity, etc., can be expressed in terms of the three fundamental quantities; Length, Mass, and Time. Each of these quantities must be measured in terms of its own units.

"The system of units, adopted by almost universal consent, and used throughout these lessons, is the so-called, 'Centimetre-Gramme-Second,' system in which the fundamental units are:

"The Centimetre as the unit of length;

The Gramme as the unit of Mass (weight);

The Second as the unit of Time."

In many of the other books on Electro-Chemistry that are accepted as a text book or guide (also in Electricity) you will come across an abbreviation like this CGS units. This has just been defined above by Thompson.

The object of this article is to give a clear conception of the Metric System and one that is comprehensive, with the object of having this system adopted by the Supreme Society of the Ameri-

can Electro-Platers' Society as a Standard. Aside from other reasons to follow its acceptance will make the other studies less complicated than they are at present, we have often heard reference to Langbein's book such as this, "Langbein's book is all right, but, "etc. The reason for this is, the units there, which were not understood, mostly.

Some people who object do not fully look up the system and its relation to the other units, others who do look them up (who do not purposely misconstrue) and still object may see a different value attributed to the same unit somewhere else, as an instance take the gallon.

In England the Imperial gallon is equivalent to a volume of 277.46 cubic inches.

In the United States the gallon is equivalent to a volume of 231 cubic inches.

It is plainly evident that the English gallon having a volume of .20032 cubic inch more than ours (about a fifth again as much) and both are called by the same name the metric equivalent for the gallon would be different, etc.

Still there are those who point out the variation between the two and say the Metric System varies and is inconsistent. This is only one instance.

A PARALLEL RELATION AND COMPARISON OF METRIC SYSTEM, SIMPLICITY.

A Nickel solution to have a volume of 6 ft.x3 ft.x4 ft. to be made up of single salts with four ounces of metal per gallon. How many gallons, and how much will the completed solution weigh.

This would be approximately (72 in.) 1,828803 metresx(36 in.) .914405 metresx(48 in.) 1.219202 metres.

72x36x48=124416 cubic inches.

$$\frac{124416}{231}$$

=538.59 gallons.

A gallon weighs 8.355 pounds.

538.59x8.355=4,499.91945 pounds weight of water.

Four ounces per gallon would be

$$\frac{4 \times 538.59}{16}$$

=134.65 lbs. metal. Nii Single salts=20.91%Ni.

$$\frac{134.65 \times 100}{20.91}$$

=about 644 pounds salts.

538.59 Gallons.

4,499.91945 pounds wt. of water.

644. pounds wt. of salts.
5,143.919 pounds wt. solution.

COMPARING THE TWO.

2,038.7462 litres.
2,038,746,24 cc. or g. wt. of water
290,914.818 gms. wt. of salts.
2,329,561.058 gms total weight.
.0022046 gms per ounce.
5135.7503084668 Adv. pounds.

Which only shows a difference of 8.17 lbs. in a total weight of over 5,000 which is close enough when it is remembered that decimal equivalents were used and some of the figures only approximate.

1.828803x.914405x1.219202=2.03874624 cubic metres.

**A cubice metre weighs a Metric Ton. Simply by moving the decimal point will now give the weight and volume as a thousand litres are a ton;

2.03874624x1000 (move decimal 3 places)=2,038.74624=cubic dcm's, litres, or Kgs.

2,038.74624x1000 (move decimal)=2,038,746.24 cu. cm. (cc) or grams (g).**

Four ounces per gallon would be about .029885 grams per cc.

.029885x100
20.91

=.1427 gms per cubic cm.

One million cubic centimetres equal one Metric ton, so the operation inclosed with stars above can be done by moving decimal six places.

2,038,746.24 ccx.1427 g.=wt. in gms. or,
290,9914.818448 gms. weight of salts.
2,329561.058 gms as total wt. lcc=1 g.

The Metric System would be advantageous for us to use in relation to our analysis of the different solutions, and the relation they bear to eah other. This don't mean that it is absolutely necessary for us to have scales weighing in grams and kilogrammes for large quantities, etc., or that we have to use the whole system as it has been defined in the fore part of this article.

Take the measurement of the tank or solution in the ordinary way that you are used to, instead of figuring out to gallons from cubic feet though, multiply the cubic feet by 28.3137 this will give you the number of litres in the tank, and, as the litre is 1000 cubic centimetres, then by moving the decimal point three places to the right (multiply by 1000) you will have the answer in cc. or the weight in grammes as one cubic centimetre weighs a gram.

If you take your measurement in inches, then after getting cubic inches multiply by .0163853 the answer will be in litres, as above, move decimal for cc.

If your formula calls for so many gramms per cubic centimetre, or per litre, you are now in condition to make up your solution by the formula.

If you wish to analyze your solution all you have to do is to take out any number of cubic centimetres, measured by pipette or graduate, as a sample analyze it and find out the amount of substance required for the amount of the sample taken, after this is determined then divide the total amount of your solution by the amount taken to test, and multiply the total amount required for sample tested, by the answer, this will give the total amount required for all.

Suppose you have taken one cubic centimetre and found it required any number of gramms per cubic centimetre multiply the amount in gramms per cc by 133.98 the answer will be ounces required per gallon.

Suppose your formula for a nickel solution calls for two (2) ounces of Magnessium Sulphate per gallon. Two ounces would be 2/16 of a pound; divide the two (placing the decimal after it and adding five ciphers) by sixteen, the answer will be the decimal parts (or fraction) of a pound. Now as there are 454 grams in an advoirdupois pound multiply the result by 454 and the answer will be grams per gallon. As one gallon contains (U. S.) 3.785 litres then this divided into gms per gal. will give grams per litre, moving the decimal point three places to the left will be the grams per cubic centimetre. You are now in a position to analyze one cubic centimetre or any number and find out the amount required and replenish your solution accordingly. By reversing the operation you are able to change gramms per cc to ozs per gallon, etc. It is not at all necessary to add five ciphers unless the number will carry over five decimal places. If the decimal is to be moved three places to the left and there are only one or two figures it is necessary to fill those places in with ciphers.

2/16 is one eighth, one eighth is 125; 125x75;=56.75; 56.75 divided by 3.785 equals 14.9933-plus; moving the decimal three places to the left and adding the cipher to fill, gives .0149933-g. per cc. equals two ozs. per gallon.

From the above then it will be understood how these figures are obtained and to avoid the mathematics as much as possible and make it simpler then just take the figure 133.98 (or 134.) using it as the factor then to change from grams per cc to ozs. per gal. use it to multiply; to change ounces per gallon to gramms per cubic centimetre then use it to divide.

As this paper would be too long if I carried it out as I had intended to, that is, explanation of the Chemistry in the same way to make it clear, then I will close it with just a little explanation of the Normal solutions and the relation of the Atomic Weights to them. You can get tables of atomic weights in any text book or probably they may be published in the bulletin.

A STANDARD NORMAL SOLUTION IS GRAM ATOMIC WEIGHT DIVIDED BY THE VALENCE.

A Standard Normal Solution though is one used by Chemists and is made up in such a way that its relation to any other solution is definite and relative, they are made by using the table of atomic weights and taking Hydrogen as the STANDARD. Therefore a standard normal solution is a solution made up in such a way that one litre (1000 cc) will contain the gram Molecular Weight of the Hydrogen or of its equivalent. This means that the figures in the column under (H) or that column representing the relative weight of the Elements in relation to an equal volume of Hydrogen. REPRESENTING HYDROGEN AS (1) ONE GRAM, then an EQUAL VOLUME OF HYDROGEN would weigh ONE SIXTEENTH AS MUCH AS AN EQUAL VOLUME OF OXYGEN, therefore the atomic weight of OXYGEN is (16) sixteen, CHLORINE 35.5 SILVER (Ag) 107.88, commonly taken as 108, etc. The symbol for silver is Ag, etc., this is the chemist's short hand or abbreviation. SULPHURIC ACID HAS A GRAM MOLECULAR WEIGHT (taking the atomic weights in grams) of (H_2) or two times 1 plus one of (S) sulphur 32. plus (O_4) four of oxygen 4x16 giving a total of 2 plus 32 plus 64 or a total molecular weight of 98; but as there are two of Hydrogen and a Normal solution only contains one, then dividing by two, we get 49 and weighing out 49 grams of sulphuric acid and diluting it to exactly one litre we have 49 g in 1000 cc and one cc contains .049 grams of sulphuric acid and will exactly neutralize any normal solution of alkali. Any normal solution of alkali will exactly neutralize, exactly the same amount of any normal acid.

GENTLEMEN THIS ARTICLE WAS PREPARED WITH THE HOPE THAT WE WOULD ADOPT THESE SYSTEMS AS STANDARD AND ALL OF US USE THEM, SOME OF US KNOW MORE ABOUT IT THAN OTHERS, again, PROBABLY SOME OF US HAVE LEARNED OR NOW UNDERSTAND THEM BETTER THAN WE DID BEFORE. IT WAS QUITE A JOB FOR ME TO PREPARE IT AS I HAD TO FIGURE NEARLY ALL OF IT OUT TO MAKE IT CLEAR AND IN DOING SO I LEARNED SOMETHING. GO TO IT AND PASS IT ALONG.

I have given the figures used to obtain results in the calculations so that in case of error (which I doubt) it is immaterial.

MOTION PLATING.

Read at the Dayton Convention by H. J. RICHARDS.

The first copy of the Quarterly Review that I received, the January, 1914 number, contained an article from the pen of Mr. R. W. Davenport, entitled The Why of Electro Plating, and one sentence at the close of that fine paper, I copy entire, because it explains clearly the why of Motion Plating. Mr. Davenport says it is probably clear to you that the effect of increased voltage is to increase the current density at the electrodes, and that burning is caused by the inability of the current to bring fresh nickel to the cathode as fast as it is removed, agitating the solution, enables us to use a higher voltage and sometimes proves economical.

Two years of constant use of a motion plating aparatus at the Koken Barbers Supply Co., plating a great number of and variety of castings daily, has yet to reveal a single case in which it did not prove economical.

In the Review of December, 1914, Dr. Watts in his paper on Some Observations of Nickel Plating Solutions, says: There are several methods of making a dilute solution do the work of a concentrated one, to circulate or stir the solution or to move the object, any process that will break up the film or dilute solution formed around the object, and supply metal as fast as it is needed for deposition. Professor Watts adds circulation and stirring of the solution has long been used in the electrolytic refining of metals, but because of stirring up the sediment, always present in plating tanks or possibly some other reasons, these methods have not come into regular use in commercial plating. Think of it, long been successfully used in electrolytic metal refining, but too much trouble for us to adopt to plating conditions.

Now first as to sediment. I run an ordinary double salt solution four months without filtering or cleaning out in conjunction with motion plating and have never had a single batch of work injured by sediment. Sediment in a plating solution is not a necessity, but a fault and should be corrected periodically My motion mechanism on a 500 gallon tank takes less than ¼ horse power to operate, and we are getting a deposit on the work in 20 minutes that it takes an hour and a quarter to produce by still plating.

A 500 gallon tank doing the work of 1500 gallons. There is another reason for the low voltage we are compelled to use in still plating, like all forces, electricity always seeks and finds the path of least resistance, it always finds the short cut, so the point or part of the object which sticks out nearest to the anode, is the part that gets burnt. This in many cases compels the use of more resistance and considerably lengthens the time of deposition.

If by a motion you continually change the relative positions of cathode and anode, this condition will cease to exist.

Now I will come to one more fault in still plating, the lack of uniformity.

This is mostly caused by an unequal distribution of the anodes and poor contact with cathode rod. I find with motion plating I get unfailing uniformity, the relation of each cathode to each anode being identical, and there being just sufficient pull on the cathode carriers to insure a good contact. A swinging or pendulum motion is incorrect, as all parts of the cathode do not get the same motion and the parts getting the least motion would probably burn. A sediment stirring motion is incorrect as we can never entirely get rid of sediment. The motion therefore should continually move the cathode into new solution, change relative position of cathode and anode, and should be adapted to a wide range of work. I take the current direct from the bus bars at the voltage found suitable using no rheostats, no resistance.

Resistance is exactly what its name implies, and is always a waste. The cutting down of the voltage at the tanks with a rheostat, with its subsequent loss of amperage, can be likened to a man driving an automobile through a village, and reducing his speed to the village requirements entirely by the use of a brake.

I do not touch on any contention as to the composition of the solution, any anodes, any temperature which are successful in still plating, will invariably and infallibly be found still more successful in motion plating.

SHINE JUST WHERE YOU ARE.

Don't waste your time in longing
  For bright impossible things;
Don't sit supinely yearning
  For the swiftness of angel's wings.
Don't spurn to be a rushlight
  Because you are not a star,
But brighten some bit of darkness
  By shining just where you are.
There is need of the tiniest candle
  As well as the garish sun;
The humblest deed is ennobled
  When it is worthily done:
You may never be called to brighten
  The darkened regions afar;
So fill, for the day, your mission
  By shining just where you are.

—John Hay.

BRIGHT SILVER PLATING.

By Mr. Frank J. Burkhart of Cleveland Branch.

Speaking of silver solution for different classes of work where buffing or scratch brushing is entirely eliminated, I will refer to the bright silver solution this finish is known as the white or bright finish or commonly called white wash. To produce this deposit I use about 1¾ to 2 ounces of silver to the gallon, but enough free cyanide must be in existence or the work will not come out bright. The articles must also be well struck up in the silver strike at that or they will turn pink. Must also be perfectly clean before plating, time of deposit five minutes. To begin a day's work I first cut down my carbon in a solution of cyanide, then add carbon and heat the bulk until dissovled, then I add 2 to 3 ounces to my solution, which contains approximately 120 gallons. At times black sulphur spots appear on the work, but after an hour or so they disappear. I think that this is caused by not having enough free cyanide in the solution. You must regulate your carbon according to the output of your solution, as too much of it will upset same. It then needs more water and a little cyanide of silver and a rest. As to sodium carbonate in a bright silver solution, I think there is nothing that will beat it. Have turned out as high as 2000 and more pieces daily. This is a cheap finish for coffins, hardware, regalia work, souvenirs, cheap flat ware, etc. Where hand burnishing or buffing is relied on, work must run 12 to 15 minutes, is then fit for first class oxidizing or any finish you may choose.

Discussion on the Above Paper.

Mr. Henkle. I have seen work done this way that was put away for 12 years and only needed a cyanide dip to bring it up to its former finish, and I also found is very soft for oxidizing.

Mr. Hale. Do you keep up your solution from the anode?

Mr. Burkhardt. Very nearly so.

Mr. Hale. Do you make up a stock solution of silver-solution, sulphuric ether and bisulphide of carbon to keep your solution bright with?

Mr. Burkhardt. I have found that there is no life in a stock solution. I mix it up and use it at once, but I find that if I use the solution immediately after, sometimes the work has carbon spots on it.

Mr. Hale. That I think is caused by not having the carbon well dissolved. I always make up stock solution to last a month, and I also have carbon bisulphide in the strike and only strike the work 30 seconds, and plated it 1½ to 2 minutes, for a full bright finish, I used a small anode and large cathode and keep up my solution

with cyanide of silver, I use about ½ fluid ounce of stock solution to each 5 dozen handles plated and found that the proper amount.

Mr. Henckle. The reason your solution runs out of metal is because you run too much work and current and not enough anodes.

I found since we use cyanide or silver, the solution maintains itself better than it did, using the chloride of silver. The solution I am using is over 25 years old, and does good work, and the work oxidizes well and even all over, generally speaking, but we make it a practice to dip the work in the liver of sulphur, the second time, after the first has been buffed, or it does not get the full black we want.

Mr. Hale. Do you use the same racks to oxidize your work that you use to plate with?

Mr. Henckle. We do not, we use others.

Mr. Hale. Well I used the same racks all around and did not find it made any difference, of course I took the black off before using for plating, again I use about ½ pound liver of sulphur per gallon, for my oxidizing solution.

Mr. Henckle. I use about the same perhaps a little more.

THE METALIZING OF WOOD.

By H. J. Ter Doest, Cleveland Branch.

As my experience in metalizing has been confined principally to wood, I will undertake to explain the method I follow, as I have prectically no rejections and do this work nearly every day. I have also done some plaster of paris pieces and they came out just as successful as the wood. You first take the wood after a good finish has been put on it and make provision for conducting wires and weights to hold it in solution, I use a long thin screweye for that purpose, which I put in place where it does no harm, after the work is plated, which in this particular case is just where they must be anyway.

You now give it two coats of lacquer to keep out the water, this lacquer is dipped on where it is possible as that is a faster as well as a better way, after the lacquer is hard you give it a very thin coat of varnish, one part copal varnish to three of turpentine, this is applied with a brush, any kind will do, as it will flow out smooth no matter how you put it on, if you do not put so much on that it wiil drip you next put on the bronze powder after letting the varnish dry for about one-half hour or until it is set, but still very sticky; but not so sticky that the bronze powder brush will stick to it. The

bronze powder is put on with a camel or bear hair brush, and well brushed all over, so that there are no bare spots, as they will not cover when put in the solution.

The bronze powder must be of a kind that is made for that purpose, a very fine brick dust appearing kind, and sold under the various names of copper carbon bronze powder, copper lining bronze powder, finest copper plating bronze powder, etc.

After this you put on your wires very carefully, taking care not to scratch your work with same, and after thorough drying, you wash off the surplus bronze powder with water under a faucet or with a hose so as to get all over with a fair pressure of water, as on this depends largely the smoothness of your deposit, now pour over your work some silver dip solution, so as to whiten the copper bronze, look it over well for spots as they are now plainly seen, and should be touched up with a little varnish and bronze powder and again silver dip poured over the whole and if all is well hang in the duplex copper where if well done it should at once start to cover, radiating from the wires.

The thickness of deposit desired will determine how long to run them also the speed at which you can run them will be determined by the size of the article and the size of the solution also the distance from anode to cathode, the smaller the article the faster they can be run, by that I mean amperes per square foot. Also the more solution in relation to the work the faster you can run it, but the solution must be between the anode and cathode otherwise it does not count.

I generally run my work, which by the way, must be buffed to a high finish and nickel plated. About 9 hours for a deposit of 1/16 ounce per square inch, or approximately 24 amperes per square foot at ½ volt, and only plate about 1 square foot in about 70 gallons of solution and use a solution that contains at 19° Beaume 6 ounces of free sulphuric acid per gallon, the reason I use so much free acid is because I find that the more acid up to that point, the smoother the deposit, but you will find you cannot go any further as you will not get the deposit according to the electrochemical equivalents, and consequently deposit gas as well as copper thus making your deposit brittle as well as sticky, unless you use such a low current density that you would never get any work done.

This silver dip I speak of, is the regular made up by dissolving chloride or cyanide of silver in cyanide, and the reason for using this is twofold; 1st it leaves the work so that water will cover it uniformly all over, or in other words it cleans it. The second reason is; when you whiten your work it shows plainly if you have any bare spots.

The reason I say pour it over, is because, otherwise you will have trouble with air bubbles sticking to your work.

That there is a wide field for investigation along the lines of current density per cubic inch, or foot of solution, goes without saying, as you can plate say one small piece of work in a large solution to a current density so that it will plate twice as fast as you can a tank full of the same work, or visa-versa, according to the condition of the solution. I hope some day we will know more about this part of our work generally, as this applies to all solutions alike.

In conclusion, I might say that the plaster paris parts that I have done, were varnished instead of the lacquering as on the wood.

THE HABIT OF HELPING.

Have you developed it?

Have you made a practice of helping some other person over a rough place simply for the joy that you can get out of the act?

Have you ever experienced the exhilaration that comes from doing somebody else a good turn without expecting to be rewarded for it? Of course you have. Everybody does such things occasionaly, but did you ever think that it will be worth your while to repeat it? Dil you ever think that repetition means habit, and that good habits are worth cultivating?

Besides this, doing something for the other fellow occasionally brings into action a new set of faculties. Most of us have been wrapped up in ourselves so long that we can think of nothing else—can do nothing for anybody except ourselves. Let us cultivate the habit of helping others, of going out of our way to be of service to our fellow men—just because it makes us happy to help somebody else.—Fraternal Union.

Look not on yesterday, nor trouble borrow
Of what may be in store for you to-morrow.
The past is past, the present fills the air
This day, and this day only is our care.
Who gives each day the best that in him lies
Will find the path that leads to higher skies.

And once again St. Louis gets it in the jugular, a blooming left handed pitcher, with an 180 batting average, has to go and hit and hit a three-bagger with two on, and blooey goes our Federal League Pennant.

Now comes Cleveland and wants to count us out of fourth place. I suppose if H. Heavyweight Williams was still in Cleveland they would count him for two.

CONCERNING RAPID NICKEL PLATING SOLUTIONS.

A well known Platers Supply Company asked the following questions to promote open discussion of the characteristic properties of a rapid nickel plating deposit:

1. If as claimed these rapid solutions yield a deposit which is softer than is obtained when using the nickel salts alone, is it not possible that this softer deposit, although more economical to buff, is a less desirable deposit from the standpoint of service to the consumer? If we have made it easier to buff, have we not also made it easier to wear and erode in service?

2. Do these rapid nickel solutions furnish an electro plate with as enduring and permanent a lustre? We believe that in course of electrolysis, not alone is the metallic nickel deposit but there is also occluded a deposit of the metallic sodium, potassium or magnesium. The electro plate then being not one of pure hard nickel alone but rather a softer alloy of nickel and one or more of the other metals.

The metal content of a nickel solution or the kind of conducting salt used do not alone effect the characterictic properties of the electro deposit, the temperature and rate of deposition being important factors.

It is true that the current density which can be successfully applied in plating depends upon the density of the solution but the cause which limits the flow of current which can be used in a solution of low metallic content can be reached in a high concentrated solution. If, for example, a nickel solution containing 12 ounces double nickel salts per gallon and run at 70° F it is found that 3 amperes per square foot is the right current to use on steel which must be bent or curved after plating, a higher current giving a deposit found to be too brittle.

The plater may then use a solution of higher metallic content and with a good conducting salt run at 70°F and find that he can get satisfactory deposit using 5 amperes per square foot of cathode surface. If he should then further increase the current he would experience the same difficulties in obtaining a soft deposit as were encountered in the double nickel salt solution. These figures are merely used relatively for example to show that it is as much possible to get a deposit of any degree of hardness using a rapid nickel plating solution, as when using a double nickel salt solution. The operator must pay attention to the temperature and rate of deposition of the different classes of work.

Just a word concerning double nickel salts which has been referred to in solution as nickel salts alone. A double nickel salt bath is a solution of nickel sulphate with an ammonium sulphate conducting salt. This solution gives all the reactions for nickel, ammonium and sulphate, that is, all the ions are present. In

the formation of the double salt, union does not take place until the solution reaches the point of saturation.

Sodium, potassium and magnesium are strongly electro positive metals and are deposited with difficulty from aqueous solution as they decompose water. The only method used to produce magnesium is to deposit it in a molten state from a fused magnesium salt. Sodium and potassium have a great affinity for oxygen and when the ions give up their charge during electrolysis of an aqueous solution, the metals decompose water, liberating hydrogen and forming sodium hydroxide or potassium hydroxide.

Under certain condition sodium may be deposited from an equeous brine solution. The strength of the brine solution is important if the sodium content is low hydrogen not sodium will be evolved. A cathode metal with high hydrogen overvoltage must be used with high current densities to secure a sodium alloy. Nickel has a very low hydrogen overvoltage and it would therefore be impossible to deposit a sodium and nickel alloy from nickel solution containing a comparatively small amount of sodium salt as a conductor.

In a paper written on the subject of single nickel salt solution, the writer gave a formula which contained one ounce nickel carbonate per gallon of solution. Since then inquiries have been received asking for the why of the nickel carbonate, saying it would not disolve to any great extent in a nickel sulphate solution. Nickel carbonate will not dissolve in a neutral nickel solution and was only added to the solution to keep it neutral.

If nickel is deposited from a nickel sulphate solution faster than it is dissolved from the anodes, the SO_4 radical unites with hydrogen forming sulphuric acid which causes an evolution of hydrogen at the cathode lowering the cathode efficiency.

The nickel carbonate is suspended in muslin bags in the solution and will neutralize any free acid and thus keep the cathode efficiency at its greatest. The solution mentioned in the paper was worked at high current densities and would not show as high anode efficiencies as would be possible under more normal conditions. At the same time let it be remembered that the primary object of the work is to deposit metal, hence nickel carbonate was used.

Different writers on the subject of single nickel salt solution claim anode efficiencies of more than 100% which may be possible with frequent small additions of acid, but not without a corresponding small cathode efficiency.

The writer is satisfied that a single nickel salt solution run under normal conditions will not gain in metal. To be convinced on this point prepare a solution of known metallic content and acurately measure its volume. After carrying on electrolosis for considerable time filter the solution and add water to bring it up to its original bulk and then test it for its metallic contest.

E. W. HEIL,
Wichita, Kansas.

FINANCIAL STATEMENT OF THE SUPREME SOCIETY A. E. S., AS OF DATE SEPT. 15, 1915, AND BUDGET FOR BALANCE OF FISCAL YEAR ON A BASIS OF 35 PER CENT AND 20 PER CENT PER CAPITA TAX, RESPECTIVELY.

ASSETS:

Cash on hand and in bank	$171.95	
Accounts receivable	135.60	
		$307.55

ESTIMATED INCOME:

P. C. TAX on 550 Members on a 35% basis for balance of the Fiscal Year	$721.86	
700 Membership Cards	14.00	
300 Application Blanks	6.00	
700 Cons. and By-Laws, 7c each	49.00	
Charters, (4) $1.00 each	4.00	
Electros, (4) 25c each	1.00	
Total estimated income		$795.96
Total estimated resources for balance of fiscal year on a 35% basis		$1,003.41

LIABILITIES:

SALARIES:

Editors	$100.00	
Secretary-Treasurer	60.00	
Mileage of Supreme Officers (estimated)	125.00	
Reporting Annual Convention (estimated)	60.00	
Accounts Payable	47.75	
Secretary's office expense balance of year (estimated		
Printing	25.00	
Postage and incidentals	38.00	
Cost of printing Review and editor's expense account, average 600 copies	396.00	

MISCELLANEOUS:

Printing 1000 copies revised Cons. and By-Laws	40.00	
Total estimated cost for balance of year		891.75
Resourse		1,003.41
Estimated balance on hand after 1916 Convention		$111.66

NOTE.—On a 20% P. C. Tax basis substitute $412.50 for $721.86 as above giving total resources of $794.05 and total expense

(with three issues of the Review for the balance of the year) of $615.75, leaving a balance in the treasury after 1916 convention expenses are paid of $78.30. Neither of these two plans will furnish quite enough funds to finance the Supreme Society for the first three months of the 1916-17 year. It will require about $150.00.

W. FRAINE,
Secretary-Treasurer.

The recent death of Mr. Van Winkle, President of the Hanson and Van Winkle Co., at his residence, Newark, N. J., removes from the Plating Supply Industry a man who has been long and honorably identified with it.

Abraham Van Winkle with Edward Weston developed the first low voltage dynomo ever manufactured in America, and his name has ever been associated with progress in Electroplating in this Country. His loss will be keenly felt.

FULLY EXPLAINED.

A nervous lady stopped a baggage master and demanded to know why her train was arriving so late.

"Well," said he, "it's just like this: The train ahead is behind and this train was behind before besides."

A farmer in a chemical laboratory strayed,
'Tis true but sad to tell;
He mixed some glycerin with N O 2
And blew the J 2 L.

And this Review will go 2 L if you secretaries don't send in dope for publication. As long as the society wants the monthly Review, and I am the guy who has to get her out, she will sure make her monthly appearance, but honest fellers, I need material.

—ED.

WHAT THE BRANCHES ARE DOING.

Art. V.—Sec. 3 of our constitution reads as follows:

It shall be the duty of the Secretary to keep an accurate report of the proceedings of each meeting, which is to be recorded in a book for that purpose. He shall send to the editor a copy of all such reports with names of all applicants for membership and all papers for publication. He shall keep an itemized account of all receipts and expenditures. He shall also act as Corresponding Secretary.

As we depend on the branch secretaries for the information concerning meetings, we hope to make these items more interesting with their co-operation.

CHICAGO

Meets fourth Saturday of each month, 8 p. m., Western Building, Randolph Street and Michigan Avenue. Secretary, H. E. Willmore, 5911 South Boulevard, Chicago, Ill.

The regular monthly meeting was held Saturday, September 25, with O. F. Servis presiding. Mr. W. G. Meggers was elected to the office of Librarian, owing to the inability of Mr. Chas. B. Wrout to continue to serve. The Educational Committee was instructed to continue its efforts to secure instruction for a class in chemistry at one of the Technical High Schools.

Mr. S. E. Huenerfauth gave a very interesting description of a method of converting an alternating into a direct current for plating purposes by means of a rotary converter and explained in detail the economy of its application.

On the two questions submitted by the Supreme Society, Chicago Branch voted unanimously to adopt the 35 per cent method, whereby the publication of the "Monthly Review"" will be continued.

PHILADELPHIA

Meets first Friday of each month in the Harrison Laboratory Building, University of Pennsylvania, 34th and Spruce Streets. Secretary, Philip Uhl, 2432 North Twenty-ninth Street, Philadelphia, Pa.

The regular monthly meeting was held October 1, with President Bau presiding.

This Branch voted unanimously in favor of the Supreme Society levying a 35 per cent per capita tax to defray the expenses of the Supreme Society and continue the Review as a monthly publication.

NEW YORK

Meets second and fourth Friday of each month at 258 Pearl Street, New York City, 8 p. m. Secretary, Wm. Fischer, 345 East 23rd Street, New York City.

After the regular business routine on September 24, the Laboratory Committee gave an interesting lecture and demonstration on the preparation of a silver solution, showing the part that potassium and sodium cyanide play in the making up of such a solution. The lectures will be continued.

ST. LOUIS

Meets fourth Saturday of each month at Public Library Assembly Rooms. Secretary, F. C. Rushton, 4405 Blair Avenue, St. Louis, Mo.

The report of the Committee on Chemistry Class was to the effect that the Public School Board was not in a position to continue our work as a special class at present, owing to shortage of funds.

We were invited to join the regular night school classes; no action was taken, but committee was requested to see if some other plan for instruction could be arranged. Ed Musick, G. Lamkemeyer and F. Rushton are the committee.

Mr. Robt. Fischer, our instructor at McKinley High School last year, and Mr. Troxler of Newark Branch, were visitors and gave us suggestions.

We had expected some facts on the Single Nickel Salt proposition from G. S. Robins, but it was learned that he had side-tracked the Single proposition and had gone to New Jersey to Double up, it was also learned that the Robins will nest at Webster Groves, Mo. for the present. We extend our congratulations and best wishes.

DAYTON

Meets first Wednesday of each month at the Y. M. C. A., Dayton, Ohio. Secretary, Alphonz Lamoureux, 500 East First Street, Dayton, Ohio.

BUFFALO

Meets first Saturday of each month at the University of Buffalo, 8 p. m. Secretary, John G. Murphy, 71 Dingens Street, Buffalo, N. Y.

CINCINNATI

Meets once each month at Dennison Hotel, Cincinnati, Ohio. Secretary, F. H. Nordmann, 720 Froom Ave., Cincinnati, Ohio.

CLEVELAND

Meets last Saturday of each month at Central Y. M. C. A. Secretary, Charles Werft, 331 Strathmore Avenue, Cleveland, Ohio.

The monthly meeting of the Cleveland Branch held Saturday, September 25. A good attendance being present. A welcome visitor to the Branch was Mr. Charles Proctor, who gave a very interesting talk.

Plans are under way for an anniversary banquet to be held in the month of December, the date which will be published later.

TORONTO

Meets fourth Thursday of each month at Occident Hall, Bathurst and Queen Streets. Secretary, Ernest Coles, P. O. Box 5, Coleman P. O., Toronto, Ont.

The regular meeting of the Toronto Branch was held on Thursday, September 23. President Salmon presiding over an excellent attendance. The question of the "Review" was disposed of in short order. The members being unanimously in favor of publishing a monthly under almost any reasonable terms. A lengthy discussion on the type and capacity of the generator for the laboratory was held, and the decision made, that a separately excited machine was the most desirable, and the capacity to be as large as can be obtained with the funds available.

A paper on the preparation, plating and finishing of high-grade small parts was presented and claimed the members' strict attention.

NEWARK

Meets first and third Friday of each month, 8 p. m., 47 Bank Street, Newark, N. J. Secretary, Geo. Reuter, Jr., 333 S. 19th Street, Newark, N. J.

The rally of our branch on October 1 at our laboratory, 49 Bank Street, was well attended. The meeting was called to order by President Faint, who declared all regular business set aside, and in a few brief remarks, stated the object of the rally.

Mr. Geo. Hogaboom of New Britain, Conn., was the first speaker of the evening and was very cordially received, his subject was "The Advantage of Knowing Your Solutions." He said the most important factor in electro-plating was to have your solutions chemically correct. Mr. Hogaboom also told of some of his experiences with brass solutions.

MILWAUKEE

Meets first Friday of each month at Eagles Hall, 137 Second Street. Secretary, E. C. Yaeger, 962 9th Street, Milwaukee, Wis.

DETROIT

Meets first Tuesday of each month at 26 East Congress Street. Secretary, B. E. Miller, 543 Townsend Avenue, Detroit, Mich.

Our regular meeting hereafter will be held on the first Tuesday evening of each month at 26 East Congress Street.

The regular meeting of October 1, 1915, was called to order by President A. E. Wetmore in the Chair, and a large attendance of members were present.

Application for membership was received from C. S. Tompkins, 595 17th Street, Detroit, Mich.

As Mr. H. J. Hawkins has retired from the business for the time being, it was moved and supported that he be carried on the roll as an honorary member, which is to show the appreciation this Branch has received from him in the past.

Moved and supported that Secretary write a letter of condolence to Hausen-Van Winkle Co. of Chicago, upon the death of Mr. Van Winkle, which was carried.

For the benefit of the society, Mr. C. T. Eickstaedt read a paper upon the subject of Lighting Fixtures and their finishes, the samples which he produced were very interesting, so much so, that a few pieces mysteriously disappeared.

Through the efforts of Mr. Woodmansee, the Detroit Branch has succeeded in entering a class of chemistry in the public school; the first lesson will be "The Determination of Nickel in Nickel Solution."

INDIANAPOLIS

Meets last Saturday of each month at Hotel Dennison. Secretary, Louis Mertz, 925 Chadwick Street, Indianapolis, Ind.

Indianapolis Branch September meeting was held September 25 at Hotel Denison, with B. Aufterheide presiding.

A. Nelson's resignation as secretary accepted and Louis Mertz appointed temporary secretary.

Motion carried that Supreme Society place per capita tax to meet all expenses.

ROCHESTER

Meets second and fourth Friday of each month at University of Rochester. Secretary, C. V. Haring, 603 Dewey Avenue, Rochester, N. Y.

BRIDGEPORT

Meets third Friday of each month at the office of the Brass World, 260 John Street, Bridgeport, Conn. Secrtary, Nelson Barnard, 858 Howard Ave., Bridgeport, Conn.

TOLEDO

Meets every Wednesday at Toledo University. Secretary, James E. Nagle, 209 Navarre Avenue, Toledo, Ohio.

Toledo Branch is not holding any regular business meetings at present as we are attending a chemistry class two nights a week and whatever business comes along we take care of on those nights.

We were very fortunate in having a special course in chemistry laid out for us at the Toledo University, with Professor H. R. Krieder as instructor. The desire of the average plater for an understanding of chemistry is evidenced by the way the members are going after the work. I predict that if the members stick to it as they have started, we will have some very able talent in Toledo Branch in time to come.

Applications for Membership

DETROIT BRANCH:

C. S. Tompkins ..... 595 17th Street, Detroit, Mich.

TORONTO BRANCH:

John Lougheed ..... 339 Lippincot Street, Toronto, Ont.
Thos. G. O'Keefe ..... 676 Hurn Street, Toronto Ont.

PHILADELPHIA BRANCH:

Harry Seaser ..... 132 Bridge Street, Spring City, Pa.
Wm. P. Scott (associate) ..... 415 Bulletin Bldg., Philadelphia, Pa.

Elected to Membership

MILWAUKEE BRANCH:

Fred Kummer ..... 1005 Sycamore Street, Milwaukee, Wis.

CHICAGO BRANCH:

Anton V. Sedlack ..... 317 S. 2nd Street, Maywood, Ill.
H. H. Wolverton ..... % Kalamazoo Stove Wks., Kalamazoo, Mich.
A. J. Hazucha ..... 1842 Barry Avenue, Chicago, Ill.

Change of Address

D. Swanson ..... 3022 Clifton Avenue, Chicago, Ill.
C. A. Manz ..... 213 Marquette Blvd., Chicago, Ill.
J. Emmett ..... 526 Grove Street, Laport, Ind.
John A. Wilkinson ..... 271 S. 55th Street, Philadelphia, Pa.

CAN THIS BE TRUE?

A plater went to his home one night
A troubled, sad and dejected wight,
He welcomed the setting sun
He ate his supper and sought his room
With heart that was heavy and full of gloom
Though his daily work was done.

For everything had gone wrong that week
His very best tanks has started to leak,
And he couldn't make them stop
And just because the barrel was new
The shiners had kicked about the glue
Though it came from the very same shop.

His brass solution had acted mean
His new cleaning compound it wouldn't clean,
Although it was well recommended
For the dirt on the castings it just seemed to stick
You couldn't have pried it away with a pick.
His scrubbers were sorely offended.

His main countershaft had run hot all day long
And every dum thing had just seemed to go wrong.
And he thought of his troubles deep
And as he sat sadly, wearily thinking
His eyelids grew heavy and started a blinking,
And he sank in a troubled sleep.

And as he slept, he dreamed that he died
And passed through the Golden Gates opened wide.
Where nickel solutions ain't known,
And he got fixed up with his heavenly things
His golden harp and a pair of wings
His troubles forever had flown.

Here silver is silver and gold is gold
And iron for brass is never sold
Deception he always hated,
And looking around, his eyes always were sharp,
He happened to look real close at his harp,
And lo and behold it was plated.

—H. J. Richards.